

Morton County Livestock Manure Management Program



Morton County Soil Conservation District
2540 Overlook Lane, Mandan, ND 58554
E-mail sherry.bender@nd.nacdnet.net

Morton County Livestock Manure Management Program

SPONSOR: Morton County Soil Conservation District

2540 Overlook Lane

Mandan, ND 58554-1593

(701) 667-1163 Ext.3

Sherry.bender@nd.nacdnet.net

STATE CONTACT PERSON: Greg Sandness

Phone: (701) 328-5232

e-mail: gsandnes@state.nd.us

STATE: North Dakota

WATERSHEDS: Missouri River, Heart River, Cannonball River, Big Muddy Creek, Square Butte Creek, Little Heart River, Chanta Peta Creek, Louse Creek, and Hailstone Creek

HYDROLOGIC UNIT CODE: 10130206, 10130203, 10130101, and 10130102

HIGH PRIOROTY WATERSHED: yes

TMDL Development and/or Implementation

PROJECT TYPES

☒ STAFFING & SUPPORT

☐ WATERSHED

☐ GROUNDWATER

☒ I & E

WATERBODY TYPES

☐ GROUNDWATER

☒ LAKES/RESERVOIRS

☒ RIVERS

☒ STREAMS

☐ WETLANDS

☐ OTHER

NPS CATEGORY

☒ AGRICULTURE

☐ URBAN RUNOFF

☐ SILVICULTURE

☐ CONSTRUCTION

☐ RESOURCE

EXTRACTION

☐ STOWAGE/LAND
DISPOSAL

PROJECT LOCATION: Morton County, North Dakota

MAJOR GOAL: The Morton County Livestock Manure Management Program is intended to improve surface water quality in Morton County by reducing runoff of pollutants from livestock areas. The district plans to provide technical, financial, and educational assistance to livestock producers in the Square Butte (Otter Creek), Crown Butte, Sweet Briar, and Heart River Corridor Watershed areas.. Our goal is to assist county producers in becoming compliant with State AFO rules and to see a reduction in the number of polluting livestock operations in these watershed areas.. By the end of the project we propose to have 22 manure management systems installed and approved by the North Dakota Department of Health rules and regulations.

PROJECT DESCRIPTION: The project sponsors intend to 1) prioritize technical and financial assistance to Morton County AFO's that have the greatest impact on water quality in the designated watershed areas, 2) develop educational programs to heighten public awareness of NPS pollution concerns and solutions 3) develop working partnerships in the local community to benefit natural resources.

319 Incremental Funds: \$ 577,505

319 Base Funds \$ 345,395

Total 319 Funds Requested: \$ 922,900

Other Federal Funds: \$1,690,000

Match: \$ 615,267

Total project cost: \$3,228,167

2.0 STATEMENT OF NEED

Long term maintenance and/or improvement of the beneficial uses of the water resources in Morton County are a priority of the Morton County Soil Conservation District (SCD) and its local resource management partners. To act on these priorities, the SCD will take an incremental approach to address all the potential sources of NPS pollution throughout the county. These efforts will focus on identified sources within specific watersheds as well as priority sources of pollution issues known to be county-wide. Some of the potential sources of NPS pollutants include urban areas, major construction sites, agricultural lands, and small acreage ranchettes.

As a starting point, Phase 1 of this long term initiative will focus on manure management and the evaluation of specific watershed management needs. Of particular concern during Phase 1 is the impact livestock manure from animal feeding operations may be having on the recreational and/or aquatic life uses of some; if not all, the surface waters in the county. In Phase I, the Morton County SCD will focus their efforts on priority watersheds: Square Butte (Otter), Crown Butte, Sweet Briar, and the Heart River Corridor.

Five waterbodies in Morton County are listed on the TMDL list due to fecal coliform bacteria and/or recreational use impairments. These waterbodies: **Square Butte (Otter) Creek, Cannonball River, Crown Butte Dam, Sweet Briar Dam, and Danzig Dam** are listed on the 2004 Integrated Report. The priority watersheds for this proposal include the Square Butte (Otter), Crown Butte, Sweet Briar, and the Heart River Corridor. The livestock feeding operations within this priority area will be given the highest priority status. In addition, the total number of livestock in the county suggests improved livestock manure management should be a county-wide priority to help ensure long term maintenance or protection of the beneficial uses of all the waterbodies throughout the county.

The North Dakota Department of Health conducted an aerial survey of Morton County in June of 2001. This survey identified 636 Animal Feeding Operations in the county, with 458 of these operations being “bad”: located less than ¼ of a mile from a water conveyance and with high potential to pollute the water. There are 143 of these AFO’s in the designated priority watersheds, with 89 being ranked as high potential medium size; and 54 being high potential small size.

During the five year period of this project, the Morton County SCD will focus efforts on the medium (300-999 AU) and small (<300 AU) size feeding operations with high potential to pollute. Table 1 presents a summary of the estimated number of feeding operations in those categories from the NDDH survey.

Table 1: ND Department of Health Survey of Morton County AFO’s in Priority Area

HUA	Watershed	High Potential Medium Size	High Potential Small Size	TOTALS
10130101-120, 130	Otter Creek	6	2	8
10130203-100	Crown Butte	9	2	11
10130203-110	Sweet Briar	19	10	29
<u>10130203-100, 120</u>	<u>Heart River</u>	<u>55</u>	<u>40</u>	<u>95</u>
TOTALS		89	54	143

In 2005, Morton County SCD contracted with High Plains Consortium (HPC), Bismarck, to complete one-on-one contacts and nutrient management plans with the feeding operations identified in the NDDH survey. To date, approximately 13% have been contacted. Within the four priority watersheds, four have been reclassified from high to medium potential to pollute. Five have also been reclassified from low to medium potential to pollute. In their reports, HPC notes that the general attitude of the individuals they have contacted is receptive to implementing improved manure management practices. Some have expressed interest in installing ag waste facilities.

According to 2006's ND Agricultural Statistics, Morton County is ranked #1 in the state for all cattle with 102,000 head. Morton is #1 in dairy cattle and #1 in beef cattle numbers.

In a typical Morton County beef operation, cattle are bred in early summer and calve anytime from February to May. This may depend on the cattle operation. Some cattle ranchers may fall calve also. Most cattle are fed in a feedlot in the winter months (November-March). The majority of the feed that is fed in the feedlot usually is a grass, hay and alfalfa mixture. Grain such as oats and corn is occasionally fed to the cattle for extra energy in the coldest winter periods. In the summer months, most operators practice rotational pasture grazing and have a planned grazing system. Mineral is also given to the cattle as a supplement. Most cattle are watered by a stock tank supplied by a well, but some may drink from dams, dugouts, or creeks.

A Morton County dairy operation usually consists of a parlor system. The cattle are milked in groups usually twice a day and turned out. Some stanchion style operations also exist in the county. Some operators let the cattle out into a pasture to put them on green grass. Others just feed the cattle in a feedlot fashion. In most dairies, the cows are bred, then generally 60 days before they calf, they will be dried up to have their calf. Alfalfa is the main source of hay fed to dairy cattle. Cattle may also be fed other sources of feed for nutritional value, such as corn, to help the quality of milk.

Morton County has a total area of 1,228,928 acres, or 1,920.2 square miles. Four major rivers drain the area including the Missouri River which forms the county's eastern boundary, Cannonball River which forms the south boundary, the Heart River, and the Knife River. Those river valleys are entrenched an average of 200 to 400 feet below the surrounding dissected plains. It has 15,232 acres of water in bodies of more than 40 acres in size.

The county is in the rolling Soft Shale Plain within the Northern Great Plains Spring Wheat Region. The county lies within the Missouri Plateau Physiographic District of the Plains Province. Elevation in the county ranges from 2,460 feet in the western part to less than 1,600 feet in the southeastern part.

Farming and ranching are the main economic enterprises. The county has one of the largest dairy industries in the state. The principal crops are spring wheat, other small grains, corn for silage, sunflowers, oats, peas, alfalfa, and grass-legume hay. The soils in the county vary widely in texture, depth, and other characteristics. The loamy or clayey, moderately deep to deep soils are well suited to cropland. The sandy, alkaline, or shallow soils are best suited to rangeland or pastureland. Most of the soil parent material is residual or of residual origin. Some soil parent material located in the eastern part of the county is of glacial origin. These characteristics and the steep rolling slopes make many of the soils susceptible to wind or water erosion.

About 37 percent of the county is cropland and 63 percent is rangeland, hayland, or other land. Irrigation is limited to areas along the Heart River and the Missouri River.

Morton County has experienced significant suburban expansion over the past 5 years, especially around the city of Mandan. Many subdivisions with multi-acre lots, small tract hobby farms, and hobby ranchettes now occupy former agricultural land. These newcomers need to be educated on land use limitations, alternatives to traditional landscaping, containing runoff from lots and paved surfaces, and the importance of clean water.

Traditional methods of reaching producers, such as annual information meetings, need to be augmented in Morton County because of the large number of producers needing assistance. A watershed coordinator is needed for this effort. The coordinator would be a “salesman” for compliance and promote a pro-active approach. Face-to-face on-site visits by the coordinator would be a primary outreach effort.

3.0 PROJECT DESCRIPTION

GOAL 1:

Protect and enhance the quality of the recreational and aquatic life uses in the surface water resources of the priority watersheds: Square Butte (Otter), Crown Butte, Sweet Briar, and the Heart River Corridor.

Objective 1: Provide sufficient technical assistance to urban and rural residents to plan and implement this project plan as well as future strategies addressing water quality in the county.

Task 1: Employ one full-time project coordinator to implement the tasks in this project and develop plans for future priority initiatives addressing NPS pollution concerns in the county.

Product: One full-time project coordinator focused on project development and implementation and coordination with other agencies and organizations,

Cost: – \$ 283,767

Task 2: Coordinate with other organizations, agencies, and stakeholders, as needed, to obtain additional technical and financial assistance to implement current and future projects addressing priority water quality and NPS pollution concerns. These potential partners are presented in part 4.0 Coordination Plan.

Product: – Expertise and financial resources necessary to implement current and future projects.

Cost: – Costs included in Task 1 costs

Objective 2: Reduce the estimated nutrient (nitrogen & phosphorus) loadings from the highest priority livestock feeding areas by over 50%.

Task 3: Ground truth the 2001 NDDH aerial survey of AFO's within the priority watersheds. Utilize NDSU Extension Service bulletin NM-1284, Assessment Tool for New or Existing Animal Feeding Operations, (Appendix #5) to categorize the current livestock feeding operations in the county based on potential to pollute.

Product: – Updated survey of Morton County AFO's. High, medium, and low priority list for the NDDH's estimated 198 livestock feeding operations in the priority watersheds.

Cost: – Costs included in Task 1 costs

Task 4: Contact the owners/operators of the high priority feeding operations to verify priority ranking criteria. Conduct one-on-one meetings to assist them in identifying options to improve manure management.

Product: – Contacts with high priority AFO owner/operators; report on management needs of the highest priority livestock feeding operations.

Cost: – Costs included in Task 1 costs

Task 5: Based on the priority rankings and interest, assist the owners/operators of the 22 highest ranked feeding operations to design and implement manure management systems that will reduce/prevent the delivery of NPS pollutants from the feeding area to nearby surface waters.

Product: -- Engineering designs for 22 manure management systems; 22 manure management systems installed and approved by the NDDH. Twenty-two manure management plans associated with the manure management systems.

Cost: -- \$ 1,166,600 (Note – NRCS EQIP funding will also be requested for each system.

When possible, EQIP and 319 funds will be used to partially support the costs of the installed systems. With the potential financial support of EQIP, the Task 5 costs have been limited to approximately \$50,000/system.) Engineering assistance will be provided by the NRCS, Livestock Facilities Assistance Program and/or the NPS BMP Team, at no cost to the project. The ND Agriculture Department's DP3 and ND Stockmen's Association Environmental Service Programs could also be used to fund services of private engineering firms, such as: DeHaan Grabs & Associates, Bartlett & West, Kadrmas Lee & Jackson, and K2S.

Task 6: Conduct pre and post construction evaluations of the planned manure management systems to determine potential pollutant load reductions associated with each completed system.

Product: – Annual estimates of nitrogen and phosphorus load reductions associated with each installed system. Refer to Appendix 4: the NDDH Animal Feedlot Runoff Risk Index Worksheet for AFO's for more detail on the tool to be used for the evaluations.

Cost: – Costs included in Task 1 costs.

Objective 3: Increase county resident's awareness of the importance and value of proper manure management and the measures that can be implemented to reduce/prevent the delivery of pollutants to surface waters.

Task 7: Utilize existing and future manure management systems to establish a network of demonstration sites for annual tours and individual site visits.

Product: – At least 1 tour of the demonstration sites per year. Numerous individual/small group site visits.

Cost: -- \$ 18,300

Task 8: Coordinate with NDSU Extension Service Manure Management Specialists and NRCS Specialists to conduct at least 3 workshops addressing the economics of manure utilization, composting, waterspreading, and the operation and maintenance of manure containment systems.

Product: – At least 3 workshops targeted toward livestock producers.

Cost: – \$0; utilize funds available through Dakota Prairies RC&D's Water Quality I&E Project.

Task 9: Provide technical assistance to at least 22 individual owners/operators with their manure and soil sampling; interpreting test results, manure application to land, composting manure.

Product: -- . Compilation of manure sample results to develop "average" values more specific to Morton County. Number of manure samples could range from 100-300 for the duration of the project.

Cost: -- Costs included in Task 1 costs.

Task 10: Work with the appropriate county officials to address potential livestock manure management needs associated with the small acreage ranchette developments in the county.

Product: – Technical assistance provided to the appropriate county authorities to develop a long term strategy, including a manure management component that addresses future development and management of small acreage ranchettes.

Cost: – Costs included in Task 1 costs.

Task 11: Utilize radio, newspaper articles, direct mailings, quarterly newsletter inserts, one-on-one contacts, etc. to disseminate information on current state/federal rules addressing manure management and management options that can be used to improve manure management across the county.

Product: – At least 4 news articles/year; 4 quarterly newsletter inserts/year; 2 direct mailings/year; 100+ one-on-one contacts/year.

Cost: -- \$ 17,000

Task 12: Work with the Mandan schools find at least 1 classroom willing to participate in an "Adopt a Watershed" program in the Otter Creek/Harmon Lake watershed. Classroom projects could include water sampling, riparian assessment, and identifying BMP's for the watershed.

Product: – At least 1 Mandan classroom participates in the program.

Cost: – \$ 10,000

Objective 4: Expand the ongoing Manure Management Program and Phase II water quality/NPS pollution assessment efforts into the next highest priority watersheds in the county.

Task 13: Organize and conduct joint meetings involving representatives from the Water Resource Board, County Commission, City Commissioners and other stakeholders to identify future priority areas for the Manure Management Program as well as to develop a priority schedule for implementing watershed-specific assessment projects.

Product: – Long-term assessment schedule and milestones for completing watershed assessments across the county. A map of the future priority areas for the Manure Management Program and a schedule for the transition into each priority area.

Costs: -- Costs included in Task 1 costs.

Task 14: Based on the watershed assessment priority schedule, coordinate with the NDDH to develop the appropriate monitoring plans and secure the necessary funding to support the assessment of the 4 highest priority watersheds.

Product: – Sufficient data to develop 4 watershed assessment quality assurance project plans (QAPP) will be developed and implemented.

Costs: -- \$0; Financial support for each watershed assessment will be requested from other funding sources. This project's costs will be limited to staff time.

Task 15: Develop a Section 319 project implementation plan and secure funding for the expansion of ongoing Manure Management Program into next highest priority watersheds/areas as identified under Task 14.

Product: – An approved Section 319 project implementation plan scheduling the implementation of manure management improvement efforts in the next highest priority area.

Costs: -- \$0; Financial support and management of future watershed projects will be accomplished independent of this project. This project's costs will be limited to the staff time invested in the development of the project implementation plan.

3.3 See attached Milestone Table (Appendix #2)

3.4 Not applicable

3.5 The Morton County Soil Conservation District is the appropriate entity to coordinate and implement this project. The SCD is a locally elected volunteer conservation organization that serves all the people in the county. The sponsors will work with the North Dakota Department of Health (NDDH) and NRCS to determine the need for any environmental permits for livestock waste management systems. Project staff will consult with NDDH and project engineers to determine applicability of current livestock waste regulations.

3.6 The Morton County SCD will be responsible for auditing Operation & Maintenance Agreements (O&M) on BMP's after completion of the project and yearly status reviews of EPA-319 contracts. The lifespan of each BMP will be listed in the individual contracts to ensure longevity of the practices. The producer signs the "EPA 319 Funding Agreement Provisions" form which explains in detail the consequences of destroying a BMP before the completion of its lifespan.

4.0 COORDINATION PLAN

- 4.1 1) The Morton County SCD will be the lead agency liable for project administration, conservation planning, technical assistance, educational campaign, clerical assistance, access to equipment and supplies, and annual financial support. The newly hired Watershed Coordinator will serve as a liaison between watershed projects/producers and USDA program participation.
- 2) USDA Natural Resources Conservation Service (NRCS)- NRCS will provide technical assistance by coordinating project activities, facilitating local involvement, providing technical support, and participating in educational outreach programs during the project. NRCS will also provide cost-share assistance through the Environmental Quality Incentive Program (EQIP) and will serve as participants on the local work group. Staff will incorporate existing USDA programs (financial and technical) and target resources to enhance efforts within the watershed. Existing office space and office equipment use will be made available to the project. An annual review will be conducted with the Field Office, District Conservationist, and the SCD to reaffirm and acknowledge NRCS's commitment to the project.
- 3) The NDDH will administer the Section 319 funding allocations and agreements with the Morton County SCD. Technical assistance will be provided for the development of the necessary quality assurance project plans for the watershed assessment projects and the appropriate training will be provided for the proper water quality sample collection, preservation, and transportation. Training will also be provided on project administration and the use of the Animal Feedlot Runoff Risk Index Worksheet.
- 4) North Dakota Research and Extension Service (EXT) – Extension will assist in project information and education activities. These activities will pertain to such topics as specific BMP publications and assistance with workshops and tours. The Extension Nutrient Management Specialists, Teresa Dvorak and Ron Wiederholt, will also be asked to assist with tours and demonstrations.
- 5) North Dakota Game & Fish, US Fish & Wildlife, and North Dakota Pheasants Forever will all provide technical and financial assistance.
- 6) Morton County Water Resource Board – Share common water quality goals and concerns. Square Butte (Otter) Creek Watershed is a high priority concern for the Water Resource Board since it is the contributing watershed for the new Harmon Lake project. Will provide support through the local work group and through financial commitments as well.
- 7) Other potential partners include the County Commission, Dakota Prairies Resource Conservation & Development (RC&D) Southwest Information & Education Program, Stockmen's Association, RC&D Livestock Facilities Assistance Program, NDDA Dairy P3, and the City Commissioners.

- 4.2 Local support – On July 13, 2006, the Morton County SCD sponsored a joint meeting of County Commissioners, Water Resource Board, ND State Water Commission, ND Department of Health, ND Game & Fish Department, and other stakeholders to gather their reactions, comments and recommendations on the proposed project. The meeting was well attended and support for the project was unanimous.

Since 2005, the Mandan SCD/NRCS office has received 11 requests for assistance to install feedlot systems. Four of those requests are located in this project's priority area (36%), and one request remains unfunded at this time. This shows that producers are interested and willing to install systems. It also shows the need for more SCD resources dedicated to manure management and feedlot waste facilities.

- 4.3 See attached letters of support (Appendix # 3)
- 4.4 To enhance feedlot design ideas and expand the technical and financial assistance available to producers, the Morton County SCD is coordinating with USDA's NRCS, FSA, and RC&D. In addition, the SCD routinely consults with the North Dakota Stockmen's Association's Livestock Facilities Assistance Program, and the North Dakota Department of Agriculture's Dairy Pollution Prevention Program (DP3). Coordinating with these organizations assure there is no duplication of efforts.

5.0 EVALUATION AND MONITORING PLAN

- 5.1 The Morton County SCD will coordinate with the NDDH to use the Animal Feedlot Runoff Risk Index Worksheet (AFRRIW) to estimate the total nitrogen and phosphorus (Total N & P) load reductions associated with each manure management system installed through the project. The locations of the manure management systems will also be tracked to allow the estimation of animal Total N & P load reductions within each 12 digit watershed in the project area. The cumulative Total N & P load reductions will also be maintained per watershed to estimate end-of-project benefits per 12 digit HUC. Specific data that will be collected and used to calculate load reductions associated with each manure management system is as follows:

- *Lot size and type of surface
- *Type, number, and size of livestock
- *Total days per year livestock are confined in the lot
- *Distance to nearest waterbody
- *Topography and vegetative conditions in and down gradient from the feeding area
- *Type of structural practices already in-place for reducing runoff in or through the lot
- *Frequency and timing of field applications of manure

Additional information on the AFRRIW is provided in Appendix 4.

- 5.2 The Morton SCD will keep a tally of producer contacts, both rural and urban. We will record number and acres of nutrient management plans and other BMP's completed. We will record the number of workshops held. Workshops will be interactive with producers to develop their nutrient management plans or soil interpretations. We will hold numerous informational presentations. We will record the number of feedlot tours held in this county and out of the county. Evaluations will include date, location, title of presentation, and number of people attending.
- 5.3 An SCD Board supervisor will randomly select, using standard statistical methods, names of 20 Morton County agricultural producers in the priority watersheds. The producers will be stratified by type, such as beef cattle, dairy, and other. These producers will be contacted annually by telephone. The first contact will occur after this project has been in effect for a year. The purpose of these contacts is to learn how effective our outreach program is and if these individuals know who the Morton County SCD is and any new livestock rules that have been initiated. Our local partners/stakeholders, along with the NDSU Extension Service will assist us in developing the survey to be used for these contacts.
- 5.4 Financial support for long-term operations and maintenance will be the responsibility of the cooperating producers.

6.0 BUDGET

- 6.1 See Attachments (Appendix #10)

7.0 PUBLIC INVOLVEMENT

- 7.1 Educational and informational meetings will be conducted to keep the community informed. Community leaders, County Commissioners, Water Resource Board members, City Council members, and District supervisors will be involved in decision-making processes involving the implementation of BMP's within the County.

THE MORTON COUNTY LIVESTOCK MANURE MANAGEMENT

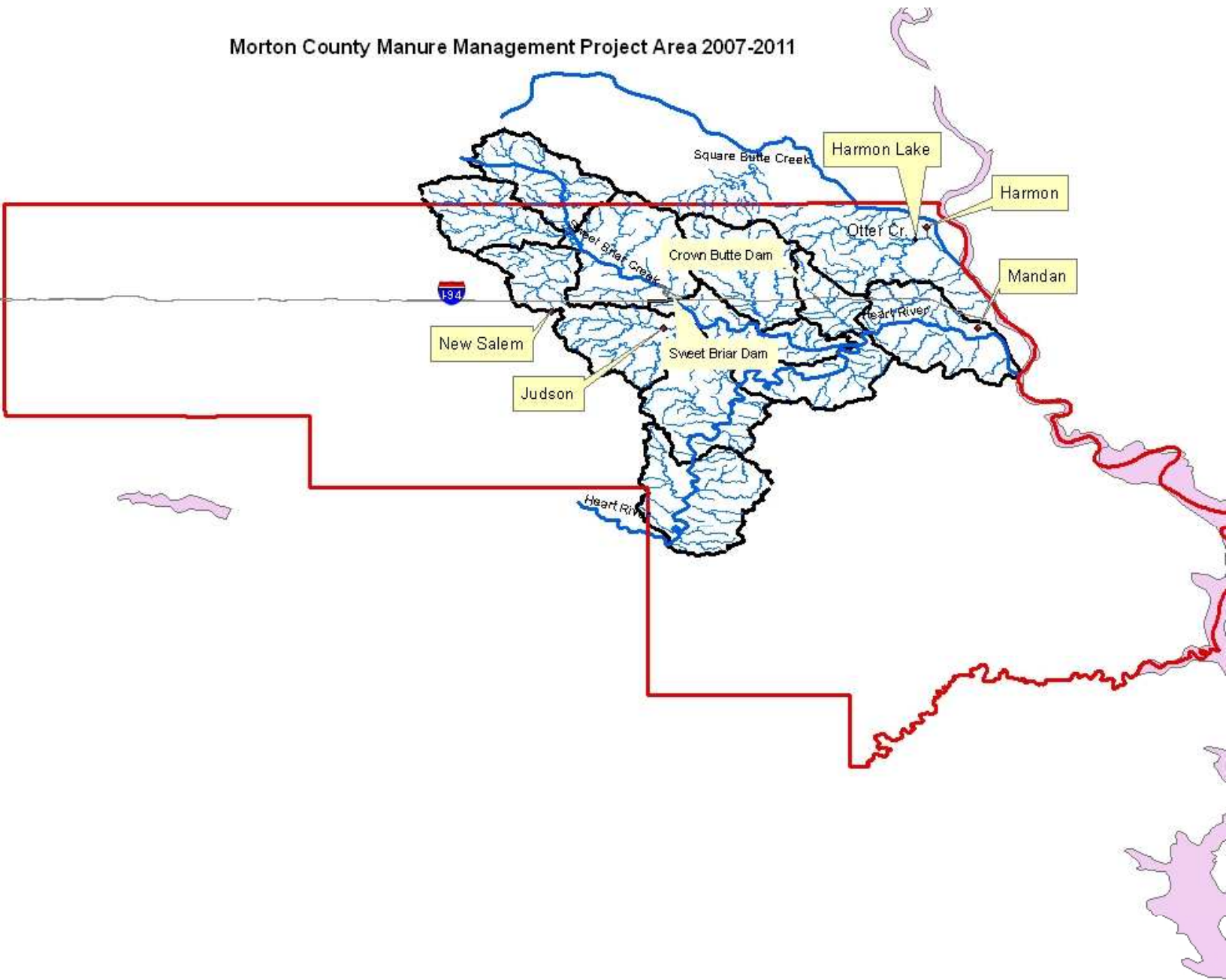
Appendix List

- 1 Morton County Map**
- 2 Milestone Table**
- 3 Letters of Support**
- 4. Animal Feedlot Runoff Risk Index Worksheet**
- 5. Assessment Tool for New or Existing Animal Feeding Operations**
- 6. Preliminary Water Chemistry Analysis for Sweet Briar and Crown Butte Dams**
- 7. 2006 List of Section 303(d) TMDL Waters for the Missouri River Basin in Morton County**
- 8. ND Department of Health Survey of Morton County AFO's**
- 9. Budget Tables**

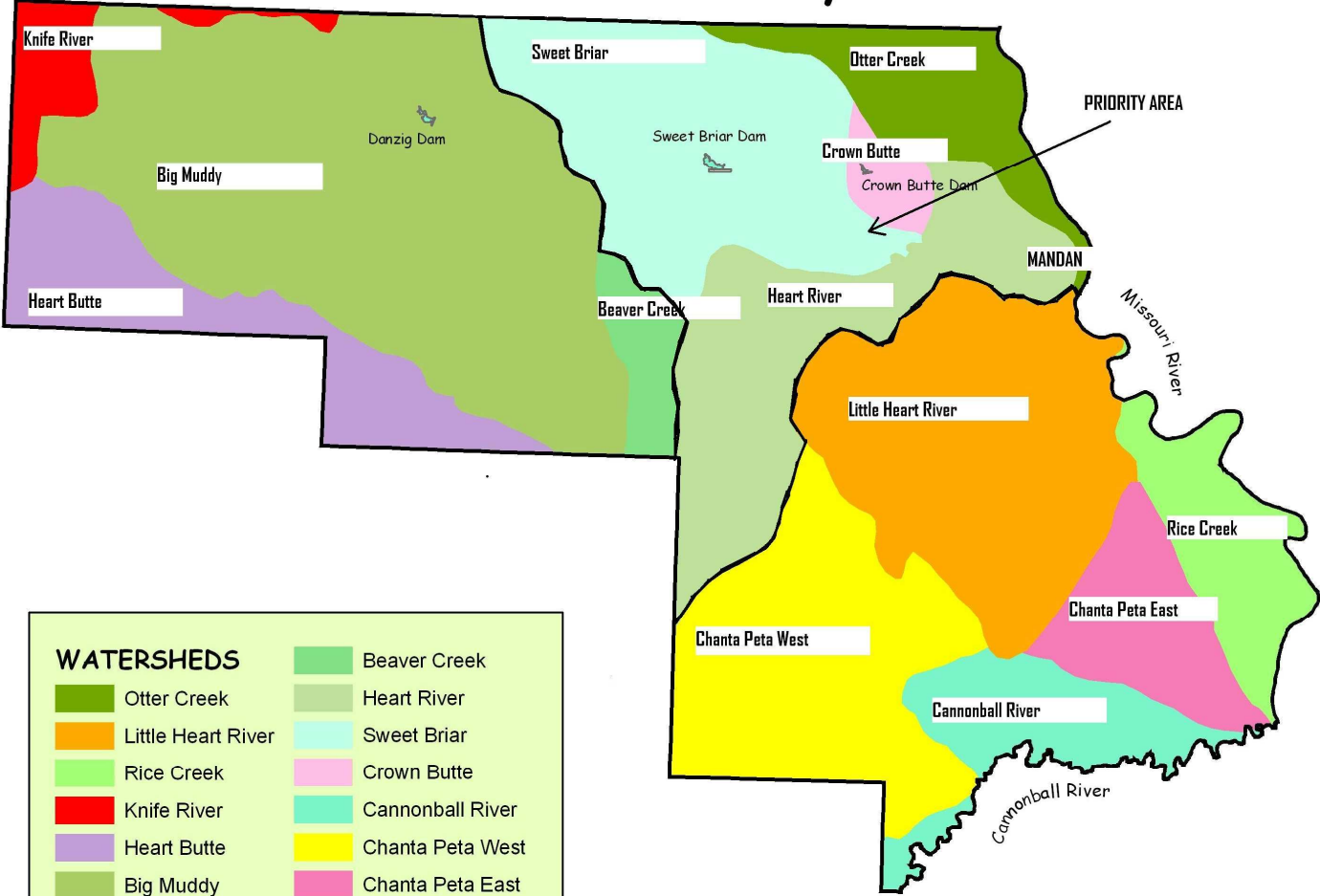
Appendix #1

MORTON COUNTY MAPS

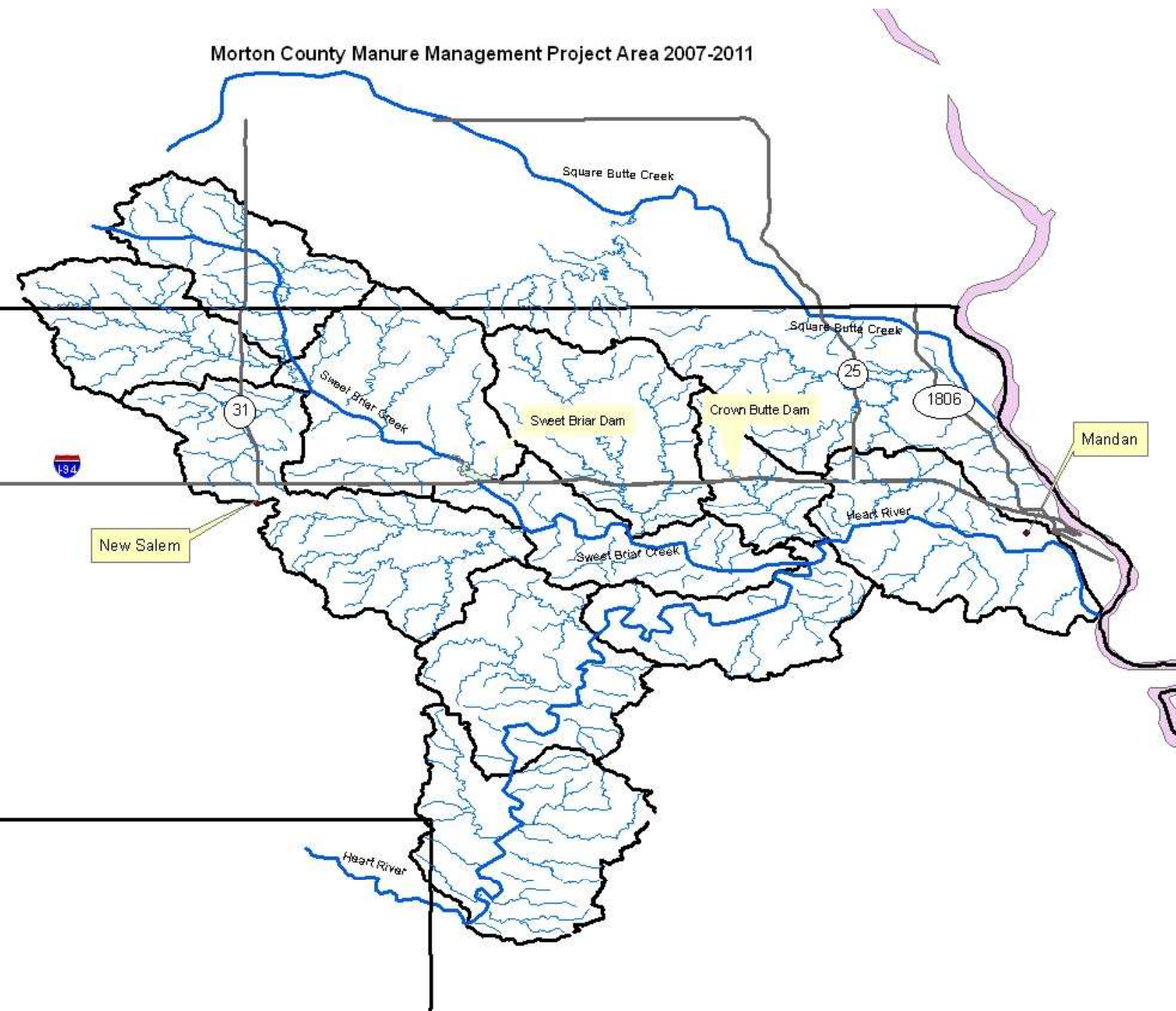
Morton County Manure Management Project Area 2007-2011



Morton County



Morton County Manure Management Project Area 2007-2011



Appendix #2

MILESTONE TABLE

MILESTONE TABLE

[illegible]

MILESTONE TABLE

[illegible]

Appendix #3

LETTERS OF SUPPORT

Morton County Water Resource District

P.O. Box 176
MANDAN, NORTH DAKOTA 58554
701-663-8549

BOARD OF COMMISSIONERS

A.C. Mork, Chairman, Mandan
Alfred Underdahl, Hebron
Lloyd T. Huber

July 26, 2006

Morton County Soil Conservation District
2540 Overlook Lane
Mandan, ND 58554-1593

Dear Supervisors:

The Morton County Water Resource District supports your project proposal to secure EPA funds for manure/nutrient management for landowners in Morton County.

We appreciate that the proposal will help producers in this watershed area apply conservation practices to their land and address the water quality issues. Some of these practices will include, but are not limited to: diversions, ponds, solid separators, access road, fencing, feedlot runoff control, waste utilization and water management systems.

As you well know we have great concerns about runoff into our Harmon Lake Recreation reservoir. This project is a water based recreation project and water quality is a primary concern of ours.

We support your proposal and applaud your efforts to address water quality issues in Morton County.

Sincerely,

Alfred Underdahl

Alfred Underdahl

COMMISSIONERS:

MATT ERHARDT, Chairman
Mandan, ND

BOB CHRISTENSEN, Vice Chairman
Mandan, ND

MARK BITZ
Mandan, ND

JAMES BOEHM
Mandan, ND

DICK TOKACH
Mandan, ND

MORTON COUNTY

STATE OF NORTH DAKOTA

210 2nd AVENUE NW
MANDAN, NORTH DAKOTA 58554
PHONE: 701-667-3300
FAX: 701-667-3453

PAUL E. TRAUGER, County Auditor
E-mail: ptrauger@state.nd.us



Morton County Soil Conservation District
2540 Overlook Lane
Mandan, North Dakota 58554

Dear Sirs:

The Morton County Commissioners totally support your 319 application for Manure/Nutrient Management Program for Morton County. This program will go a long way to apply conservation practices to land and address the water quality issues in Morton County. The Morton County Commissioners commend your efforts in this program and offer our support to the Soil Conservation District.

If the County can be of any assistance to you in this program please contract us.

Sincerely,

A handwritten signature in dark ink, appearing to read "Matt L. Erhardt". The signature is fluid and cursive, with the first name "Matt" being more prominent.

Matt L. Erhardt
Chairman Morton County Commissioners

August 1, 2006



210 2nd Avenue NW • Mandan, North Dakota 58554 • 667-3363

July 27, 2006

Morton County Soil Conservation District
2540 Overlook Lane
Mandan ND 58554-1593

Dear Supervisors:

The Morton County Parks Department supports your project proposal to secure EPA funds for manure/nutrient management for landowners in Morton County.

We appreciate that the proposal will help producers in this watershed area apply conservation practices to their land and address the water quality issues. Some of these practices will include, but are not limited to: diversions, ponds, solid separators, access roads, fencing feedlots waste utilization, and water management systems.

Morton County Parks takes an interest in this application because the result would be better water quality at the lakes and recreation sites we manage in the County.

In addition, with the construction of the Harmon Lake project, it is imperative that this new facility would fill with the cleanest water possible.

Again, we support your proposal and applaud your efforts to address water quality issues in Morton County.

Sincerely,

Vern W Davis

Vern W Davis
Morton County Parks

Appendix #4

ANIMAL FEEDLOT RUNOFF RISK INDEX WORKSHEET

North Dakota (Modified From Utah) Animal Feedlot Runoff Risk Index - Excel Spreadsheet Instructions for Use

General Information:

The worksheet can be cleared of all entries except today's date by holding down the "Ctrl" key while pressing the small "c" key. Enter the landowner, location, and planner's name in the first three yellow boxes. Today's date is automatically displayed but may be changed if desired. Once changed the program will no longer display today's date. Then enter the weather station that is closest to the site being evaluated. The precipitation at that site will automatically be entered in the green box below. Enter the hydrologic unit code (HUC) for the location of the lot being evaluated. Note the little red triangles in the corners of some of the cells. Slide the mouse pointer over the top of the cells and additional information or instructions will be displayed.

The spreadsheet allows two feedlots to be evaluated. A before and after project evaluation should be made. Enter a general description of the lot being evaluated. Then enter the size of the lot in square feet and the type of surface on the lot. Next enter the type of animal in the lot, average weight of the animals, and the number of days the animals are confined. If more than one animal type is confined list the type of animal that makes up the majority of the animals. Information about the number of square feet per animal will be automatically calculated. Click on the gray tab titled, "Space Requirements" for recommendations on the desired number of square feet per animal.

Feedlot Features, and Index and Risk Level

Using the point values obtained from Table 1, Feedlot Features, or the information in the red triangles, enter the number of points for each given feature (Containment, Distance, etc.). The computer will automatically calculate the index points and risk level for the described conditions. The spreadsheet must be used to document both the before and after project conditions for each feedlot evaluated.

Manure Management and Conservation Practices

Enter the frequency of hauling or scraping. The frequency of scraping should be entered only if all manure is scraped into a bunker or other structure where the manure will be contained during a 25-year, 24-hour storm. Lastly, enter the conservation practices that will be installed on the lot. A list of potential practices is given at the bottom of the worksheet page.

Loading Calculations

The computer will automatically calculate loading values. The total tons of manure is calculated first, then the amount of nitrogen, phosphorus, and BOD₅ after typical storage losses is calculated. N, P, and BOD₅ availability is also reduced based on the frequency of hauling or scraping. Total loading values are determined by multiplying the amount of the nutrient available by the listed precipitation, lot, and risk factors. Generally, the greater the precipitation the higher the factor. The harder the cover is on the lot the greater the likelihood of runoff and the higher the factor. The higher the risk factor, as entered in the feedlot features, the higher the factor.

Interpretation:

An interpretation table (vulnerability table) can be found by clicking on the tab at the bottom of the screen labeled "Interpretation". This table explains the ratings displayed in the row labeled "risk level".

To obtain additional information or help on the use of the Utah Animal Feedlot Runoff Risk Index, (UAFRRI) contact your nearest NRCS Area Agronomist or Kerry Goodrich at (801) 524-4568.

*North Dakota Animal Feedlot Runoff Risk Index Worksheet

Landowner:
Location:
Planner:
Date:

Weather Station:
HUC:
Precipitation:

Lot Description:				
Planning Scenario:	Before	After	Before	After
Lot Size (Sq. Ft.):				
Surface Type:				
Animal Type:				
No. of Animals:				
Avg. Weight:				
Days Confined:				
Sq.Ft./Animal:				
Feedlot Features				
Runoff Containment				
Distance to Water				
% Slope				
Vegetation				
Clean H₂O Diversion				
Index and Risk Level				
Index:				
Risk Level:				
Manure Management and Conservation Practices				
Haul/Scrape Frequency				
Practices to be implemented				
Loading Calculations				
Fresh Manure (tons)				
Total N Available (lbs)				
Total P Available (lbs)				
Total BOD₅ Available (lbs)				
Precipitation Factor				
Lot Surface Factor				
Risk Factor				
Total N Loading (lbs)				
Total P Loading (lbs)				
Total BOD₅ Loading (lbs)				

*Modified from Utah to fit North Dakota. Individual high risk features should be evaluated and conservation practices applied where possible. All runoff from a 25-year, 24-hour storm event must be contained on the lot.

Practices that might be implemented:

Move Lot	Install Dike	Install Filter Strip
Regrade Lot	Install Diversion	Roof Runoff System
Build Storage	Increase Sq.Ft./Animal	Change Hauling Frequency
Increase Storage		

Table 1
Animal Feedlot Parameters*

Lot Features	Very Low Risk	Low Risk	Medium Risk	High Risk**
Runoff Containment	Fully contained for up to a 25-year 24-hour storm ¹	Liquids and/or dry manure flows onto owned property	Dry manure is contained, but liquids are not	Flows directly to water
Distance to Water	Lot is > 1000 feet from water	Lot is 500-1000 feet from water	Lot is 100-500 feet from water or a ditch	Lot is within 100 feet of water or a ditch
% Slope of Lot	< 2%	2-3%	4-6%	> 6%
Vegetation	Filter strip or buffer that meets NRCS standards	Heavy vegetation/crops between lot and water/ditch	Weeds or sparse vegetation between lot and water/ditch	No vegetation between the lot and water or ditch
Clean Water Diversion	All upslope, roof water and trough water is diverted	Most upslope, roof, and/or trough water is diverted	Some upslope, roof, or trough water is diverted	All water runs through the lot

*Individual high-risk features should be evaluated and conservation practices applied where possible.

Lot Features	Very Low Risk	Low Risk	Medium Risk	High Risk
	Index Values			
Runoff Containment	0.0	5.0	20.0	40.0
Distance to Water	0.0	2.0	8.0	16.0
% Slope of Lot	0.0	1.5	6.0	12.0
Vegetation	0.0	1.0	4.0	8.0
Cleanwater Diversion	0.0	0.5	2.0	4.0
Index	0	10	40	80

1. New poultry, swine, and veal operations must contain manure for a 100-year, 24-hour storm.

Table 4 - Lot Vulnerability for Manure Runoff	
Manure Runoff Risk Index	General Interpretation of Utah Animal Feedlot Runoff Risk Index
< 9.5	VERY LOW potential for manure movement from the lot. If lot manure is managed according to best management principles, there is little or no probability of an adverse impact to surface or ground water.
9.5 – 34	LOW potential for manure movement from the lot. The chance of organic material and nutrients' getting into surface or groundwater is very small. Runoff containment/control alone or in combination with buffers, improved storage, increased hauling/scraping frequency, or other practices will reduce any potential impacts to surface and groundwater.
35 – 56	MEDIUM potential for manure movement from the lot. The chance of organic material and nutrients getting to surface or ground water is very likely. A combination of runoff containment/control, buffers, improved storage, increased hauling/scraping frequency and other practices will lower potential impacts to surface and groundwater.
> 56	HIGH potential for manure movement from the lot and adverse impacts to surface and ground water. Best management practices that contain the liquids and dry manure must be put in place. All manure must be contained for storm events up to a 25-year, 24-hour storm. Strong consideration should be given to relocating the lot.

Table 5
Manure Production and Loss Values

Type of Animal	Dry Manure Production Values-As Excreted							Storage Retention	
	N lb/day	P ₂ O ₅ lb/day	K ₂ O lb/day	BOD ₅ lb/day	Volume cu ft/d	Weight lb/day	Moisture %	% N	% P ₂ O ₅
Beef (Cow)	0.33	0.27	0.31	1.20	1.02	63	88	55%	75%
Beef (Feeder)	0.31	0.25	0.29	1.36	0.95	59	88	55%	75%
Beef (Yrlng)	0.30	0.23	0.24	1.30	0.89	55	87	55%	75%
Dairy (Dry)	0.36	0.11	0.28	1.20	1.32	82	88	70%	90%
Dairy (Lact)	0.45	0.16	0.31	1.60	1.29	80	88	70%	90%
Ducks	0.70	0.69	0.60	2.50	0.73	46	75	62%	85%
Goats	0.45	0.11	0.31	1.00	0.63	40	75	55%	75%
Heifers	0.31	0.09	0.29	1.30	1.37	85	89	70%	90%
Horses	0.28	0.11	0.23	1.20	0.81	50	78	55%	75%
Sheep	0.45	0.16	0.36	1.00	0.63	40	75	55%	75%
Swine (Boar)	0.15	0.11	0.12	0.65	0.34	21	91	60%	70%
Swine (Gest)	0.19	0.14	0.15	0.83	0.44	27	91	60%	70%
Swine (Grow)	0.42	0.37	0.27	2.08	1.02	63	90	60%	70%
Swine (Lact)	0.47	0.34	0.36	2.00	0.96	60	90	60%	70%
Swine (Nurs)	0.60	0.57	0.42	3.40	1.70	106	90	60%	70%
Turkeys	0.74	0.64	0.34	3.30	0.69	44	75	62%	85%

From: AWMFH, Chapter 4, p 8-17, *all values are in lb or cu ft per 1000 lbs of animal

Animal Space Requirements in Square Feet/Animal

Animal Type	Very Low		Low		Medium		High	
	Concrete	Dirt	Concrete	Dirt	Concrete	Dirt	Concrete	Dirt
Beef (Cow)	Covered Barn/Shed		60	400	30	200	<30	<200
Beef (Feeder)	Covered Barn/Shed		50	300	45	150	<30	<200
Beef (Yrlng)	Covered Barn/Shed		50	300	45	150	<30	<200
Dairy (Dry)	Covered Barn/Shed		75	400	50	300	<50	<100
Dairy (Lact)	Covered Barn/Shed		75	400	50	300	<50	<100
Ducks	Covered Barn/Shed					4		4
Goats	Covered Barn/Shed		20	40	15	25	<10	<10
Heifers	Covered Barn/Shed		60	400	30	200	<30	<200
Horses	Covered Barn/Shed			2500		1500		1000
Sheep	Covered Barn/Shed		20	40	15	25	<10	<10
Swine (Boar)	Covered Barn/Shed		30	30	15	15	10	10
Swine (Gest)	Covered Barn/Shed		30	30	15	15	10	10
Swine (Grow)	Covered Barn/Shed		30	30	15	15	10	10
Swine (Lact)	Covered Barn/Shed		30	30	15	15	10	10
Swine (Nurs)	Covered Barn/Shed		30	30	15	15	10	10
Turkeys	Covered Barn/Shed					8		8

Appendix #5

ASSESSMENT TOOL FOR NEW OR EXISTING ANIMAL FEEDING OPERATIONS

Assessment Tool for New or Existing Animal Feeding Operations



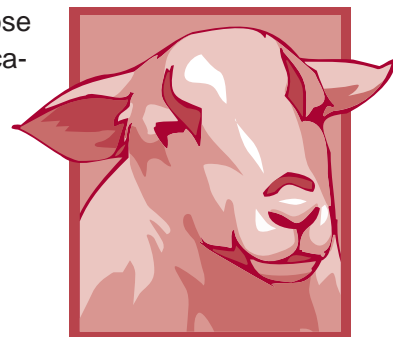
Bridget Johnson and Ron Wiederholt
Area Specialists/Livestock Nutrient Management

This workbook is designed to help producers evaluate their current livestock facility and identify potential impacts their facility may have on waters of the state. Initially, one must determine if the livestock feeding operation is classified as an animal feeding operation (AFO). An AFO is a lot or facility (other than aquatic animal production facility) where the following conditions are met:

- Animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, **and**
- Crops, vegetation, forage growth or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility

If your operation fits this definition, continue to Step 1 of the worksheet. You will find a table that identifies the three categories of animal feeding operations. A large, concentrated animal feeding operation (CAFO) is any animal feeding operation that stables or confines as many as or more than the number of animals specified in the Large CAFO column of the table in Step 1. If the facility is defined as large CAFO, the appropriate permit must be obtained from the North Dakota Department of Health by Dec. 31, 2006 and completion of either worksheet is not necessary. If the operation is defined as a medium or small AFO, continue to Step 2. Not all medium or small AFOs will require a permit. Those that do must submit the permit application to the North Dakota Department of Health by July 1, 2008.

The workbook has been developed through the efforts of the NDSU Extension Service and North Dakota Department of Health.



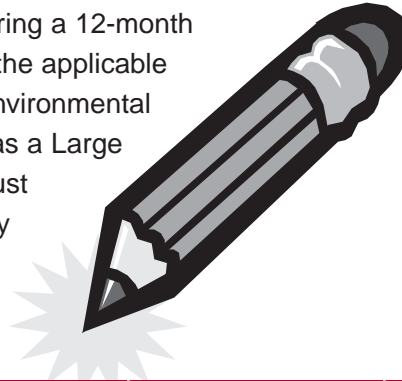
NDSU
Extension Service

North Dakota State University
Fargo, ND 58105

FEBRUARY 2005

■ Step 1

Complete the table below by inserting the maximum number of each type of livestock fed/housed within a facility for 45 days or more during a 12-month period. If the facility is defined as a Medium or Small AFO, the applicable worksheet should be completed to evaluate the potential environmental impacts associated with the facility. If the facility is defined as a Large CAFO, (see definition on page 3) the appropriate permit must be obtained from the North Dakota Department of Health by Dec. 31, 2006 and completion of either worksheet is not necessary.



Numbers of each livestock type	Maximum Number	Large CAFO	Medium AFO	Small AFO
Mature dairy cows		≥700	200-699	< 200
Veal calves		≥1,000	300-999	< 300
Cattle (not mature dairy cows or veal calves)		≥1,000	300-999	< 300
Swine (<55#)		≥10,000	3,000-9,999	< 3,000
Swine (>55#)		≥2,500	750-2,499	< 750
Horses		≥500	150-499	< 150
Sheep or lambs		≥10,000	3,000-9,999	< 3,000
Turkeys		≥55,000	16,500-54,999	< 16,500
Laying hens or broilers (liquid manure system)		≥30,000	9,000-29,999	< 9,000
Chickens (nonliquid manure system)		≥125,000	37,500-124,999	< 35,000
Laying hens (nonliquid manure system)		≥82,000	25,000-81,999	< 25,000
Ducks (liquid manure system)		≥5,000	1,500-4,999	< 1,500
Ducks (nonliquid manure system)		≥30,000	10,000-29,999	< 10,000

■ Step 2

Based on the definitions below, determine which worksheet best describes your livestock facility.

Complete the appropriate worksheet.

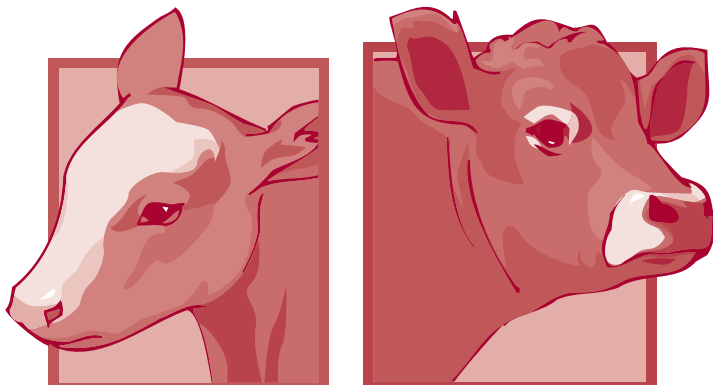
Definitions

Housed Facility — Pens or similar confinement area that is protected from the environment.

Open lot — Pens or similar confinement areas with dirt, concrete or other paved or hard surface wherein animals or poultry are substantially or entirely exposed to the outside environment except for small portions of the total confinement area affording protection by windbreaks or small shade areas.

Surface Water — For the purpose of the following worksheets, surface water is defined as any stream, lake, reservoir or pond that contains water except for infrequent periods of severe drought. This includes streams that flow only as the result of direct precipitation and snow melt. Waters completely contained on an owner's property and that do not combine or effect a junction with natural surface or underground waters are not included.

Large CAFO — Any animal feeding operation that stables or confines as many or more than the numbers of animals specified in the table of Step 1.





	Points Available	Points Assessed
1. Based on the number of animals confined for more than 45 days, what is the facility size/type?		
Medium or Small AFO with a complete manure management system permitted by the North Dakota Department of Health	Evaluation is not applicable	
Medium AFO with the numbers in the upper 50 percentile of the animal range for a Medium AFO	10	
Medium AFO with the numbers in the lower 50 percentile of the animal range for a Medium AFO	5	
Small AFO	1	
2. Soil type according to USDA soil survey maps (Unified Soil Classification):		
Course-textured soils (SP, SW, GP, GM)	5	
Silt or loam soils (MH, ML, SM)	3	
Clay soils (CH, CL, SC)	1	
3. Liquid content of manure:		
High liquid content; manure does not stack	5	
Medium liquid content; manure stacks somewhat	3	
Low liquid content; manure stacks easily	1	
4. Feed storage (excludes hay and straw):		
Runoff from raw-fed material is not contained	5	
Runoff from raw-fed material is contained or no raw material is fed	1	
5. Type of manure handling practices:		
Stockpiled outside in an uncontained area and is not field applied annually	5	
Stockpiled in an uncontained area and field applied annually	3	
Stockpiled in an uncontained area and field applied more than once per year	1	
6. Depth to groundwater below facility:		
Less than 10 feet	10	
Between 10 and 25 feet	6	
Between 26 and 50 feet	3	
Greater than 50 feet	1	
7. Duration livestock are present within the facility:		
270-365 days/year	10	
180-269 days/year	7	
90-179 days/year	4	
Less than 90 days/year	1	

8. Distance to nearest surface water (see definition of surface water):		
Less than ½ mile	10	
Between ½ and 1 mile	6	
Between 1 and 2 miles	3	
Greater than 2 miles	1	
9. Average slope and general topography between the facility and nearest surface water:		
Located adjacent to or within the floodplain of a surface water	10	
Slopes are generally greater than 6% with well defined drainage pattern	6	
Slopes are generally between 3% and 6% with a moderately defined drainage pattern	3	
Slopes are generally less than 3% with poorly defined drainage pattern	1	
		TOTAL SCORE

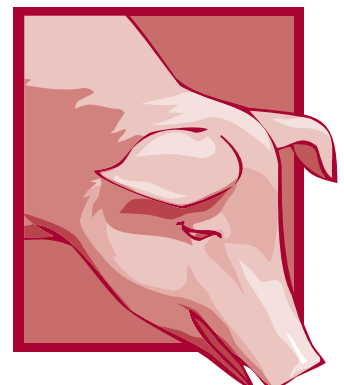
■ Potential water quality impacts associated with the animal feeding operations

Ranking	Score
High Potential	> 50
Medium Potential	25-50
Low Potential	< 25

■ Eligibility for a “No Potential to Pollute” designation from the N.D. Department of Health

Some Medium or Small AFOs may qualify for a “No Potential to Pollute” designation from the North Dakota Department of Health (NDDH). Large CAFOs are not eligible for this designation. The final determination of a facility’s eligibility for a “No Potential to Pollute” designation can be made only by NDDH personnel. However, if a Medium or Small AFO has a **total** score of 25 or less, the facility may qualify for a “No Potential to Pollute” designation. In such cases, the NDDH should be contacted to provide a final determination on the facility’s eligibility.

■ Comments on management options for facility:



■ Open Lot Evaluation Worksheet



■ Assessment and prioritization of potential water quality impacts

	Points Available	Points Assessed
1. Based on the number of animals confined for more than 45 days, what is the facility size/type?		
Medium or Small AFO with a complete manure management system permitted by the North Dakota Department of Health	Evaluation is not applicable	
Medium AFO with the numbers in the upper 50 percentile of the animal range for a Medium AFO	10	
Medium AFO with the numbers in the lower 50 percentile of the animal range for a Medium AFO	5	
Small AFO	1	
2. Soil type according to USDA soil survey maps (Unified Soil Classification):		
Course-textured soils (SP, SW, GP, GM)	5	
Silt or loam soils (MH, ML, SM)	3	
Clay soils (CH, CL, SC)	1	
3. Type of manure handling practices within the facility:		
Manure is not removed or field applied annually	5	
Stockpiled and field applied once per year	3	
Stockpiled and field applied more than once per year	1	
4. Bedding practices:		
No bedding material is used	5	
Animals are bedded only in harsh weather	3	
Animals are bedded on a regular basis	1	
5. Feed storage (excludes hay and straw):		
Runoff from raw-fed material is not contained	5	
Runoff from raw-fed material is contained or no raw material is fed	1	
6. Depth to groundwater below facility:		
Less than 10 feet	10	
Between 10 and 25 feet	6	
Between 26 and 50 feet	3	
Greater than 50 feet	1	
7. Duration livestock are present within the facility:		
270-365 days/year	10	
180-269 days/year	7	
90-179 days/year	4	
Less than 90 days/year	1	

8. Distance to nearest surface water (see definition of surface water):		
Less than ½ mile	10	
Between ½ and 1 mile	6	
Between 1 and 2 miles	3	
Greater than 2 miles	1	
9. Average slope and general topography between the facility and nearest surface water:		
Located adjacent to or within the floodplain of a surface water	10	
Slopes are generally greater than 6% with well defined drainage pattern	6	
Slopes are generally between 3% and 6% with a moderately defined drainage pattern	3	
Slopes are generally less than 3% with poorly defined drainage pattern	1	
		TOTAL SCORE

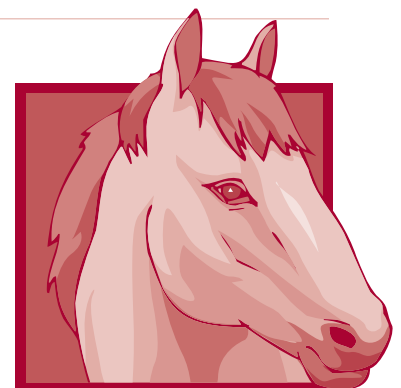
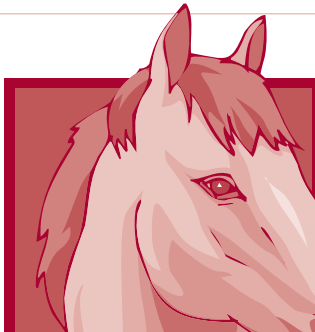
■ Potential water quality impacts associated with the animal feeding operations

Ranking	Score
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■ **Comments on management options for facility:**





For more information on this and other topics, see: www.ag.ndsu.edu



NM-1284

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200-2-05

Appendix #6

**PRELIMINARY WATER CHEMISTRY
ANALYSIS FOR
SWEET BRIAR AND
CROWN BUTTE DAMS**

Preliminary Water Chemistry Analysis

Sweetbriar & Crown Dams

Crown Butte Dam and Sweetbriar Dam are identified in the Standards of Water Quality for the State of North Dakota as Class 3 lakes. Class 3 lakes are warm water fisheries capable of supporting growth and propagation of non-salmonid fishes and associated aquatic biota. All lakes in the State of North Dakota, including Crown Butte Dam and Sweetbriar Dam, share the same beneficial uses as Class I streams. These uses are as follows: 1) municipal and domestic water supply; 2) recreation; 3) aquatic life; 4) agricultural uses; and 5) industrial water supply.

Crown Butte Dam and Sweetbriar Dam have been listed in the State's 2004 Total Maximum Daily Load (TMDL) list. The 2004 TMDL list identifies Crown Butte Dam designated uses of fish and other aquatic biota and recreation as fully supporting, but threatened as a result of low oxygen, sedimentation and excessive nutrient enrichment. Sweetbriar Dam is listed due to its designated use of recreation as fully supporting, but threatened as a result of nutrient enrichment. A TMDL priority of 1 has been assigned to each of these reservoirs. A TMDL priority of 1 is considered a high priority for TMDL development.

Crown Butte Dam and Sweetbriar Dam are located in Morton County North Dakota adjacent to Interstate 94, nine and seventeen miles west of Mandan, North Dakota, respectively. The physiographic characteristics of the region are described as a un-glaciated section of the Missouri Plateau ecoregion, which has retained its complex drainage channels and original soils.

Crown Butte Dam and Sweetbriar Dam supporting watersheds are approximately 4,000 and 100,000 acres respectively. Agriculture is the predominant land-use in the watersheds comprised of small grain, beef and dairy operations. Low density urban development is also present.

The primary goal of the current project is to collect data for the development of sediment and nutrient TMDLs for Crown Butte Dam and Sweetbriar Dam, which if implemented, will help to improve the reservoir's trophic status, and improve its beneficial uses for recreation and fishing. This was accomplished on Sweetbriar Dam by collecting and analyzing water samples from three to four proposed inlet stream sites, one outlet stream site, and one deepest reservoir site. Water quality samples were collected and analyzed on Crown Butte Dam from one inlet site, one outlet site and one deepest reservoir site. The samples were collected during the winter of 2004, and the spring, summer and fall of 2005.

The site sampling data for the major parameters and sampling dates are attached to this report. In-lake samples were collected once per month, except for the summer season when two samples per month. The stream samples were collected several times per month and during major rain events. When the stream site had no flow the sampling was suspended until the flow resumed. Sweetbriar Dam Outlet had been opened to lower the reservoir because of other problems at the lake, so additional samples were collected even during the winter season when the flow would be normally reduced or absent. Crown Butte Dam was also undergoing construction which lowered the lake levels during the early part of the summer in 2005. In-lake samples were collected following the protocol that had been established in the Quality Assurance Project Plan. Additional outlet samples were collected at Crown Butte during the drawn down period.

A comparison of the statistical data for the average water chemistry values was attached to this

report. The comparisons were made in relation to the North Dakota State Game and Fish Department's statewide averages for North Dakota lakes, the North Dakota Department of Health averages for North Dakota lakes, Lake Hoskins, a lake near Ashley, North Dakota that is undergoing TMDL development, and the data collected from Crown Butte Dam and Sweetbriar Dam. Comparisons can be made for Total Phosphorus (TP), Total Kjeldahl Nitrogen (TKN), nitrate-nitrite (N+N) and ammonia levels. In-lake samples were also compared for levels of Total Dissolved Solids (TDS) and conductivity (Cond).

The TP levels for the Crown Butte Dam sampling locations was less than the other averages used for the comparison, possibly indicating that because of extreme plant growth that the aquatic plants are utilizing the available phosphorous in the water, or the nutrient is being deposited in the reservoir basin, as the outlet samples were significantly lower. the TKN and N+N levels were also lower than the Statewide averages, with the exception of the N+N, which was dramatically higher than the average established by the North Dakota Department of Health (NDDH). in-lake ammonia levels were also lower than the Statewide average. TDS levels were between the Statewide and NDDH average as listed in the table. Total nitrogen levels were highest in the deepest portion of the reservoir, thus indicating that most of this nutrient is being deposited in the reservoir basin.

The TP levels for the inlet sampling sites at Sweetbriar Dam averaged less than the Statewide and NDDH levels. The northwest tributary had the highest average for TP levels. This tributary drains a major portion of the watershed. The northwest and northeast tributaries had higher averages than the Statewide or NDDH averages for TKN. The other sampling areas were well below the Statewide averages. Several livestock feeding operations are located along these tributaries. The N+N and ammonia averages for the Sweetbriar Dam site were below the Statewide average, but above the NDDH averages. The highest averages were noted from the outlet samples. The in-lake conductivity and TDS averages were found to be between the Statewide and HDDH published averages.

Dissolved phosphorus readings averaged consistently higher in the Sweetbriar Dam watershed, with the highest level noted at the Crown Butte Inlet sample site and the Sweetbriar Dam in-lake site. Total Suspended Solid average values were also higher in the Sweetbriar Dam watershed. The highest TSS average levels were noted from the tributaries with the most animal feedlot operations. The total nitrogen levels also followed this pattern, with the Sweetbriar Dam tributaries exhibiting the highest average values.

These data will be further analyzed using the Bathtub model to estimate loading levels for the nutrient parameters. By changing various scenarios the estimated and predicted values can be established. This modeling data along with the AGNPS land-use modeling data will be used to develop a TMDL for Crown Butte Dam and Sweetbriar Dam, and implement some best management practice in the watershed to attempt to meet the targeted nutrient levels within these watersheds.

Nutrient Management Application Data

Table 7. Statewide Average Water Quality Values Compared to Lake Hoskins

mg/l	TDS	Cond	TP	TKN	Nitrate/ Nitrite	Ammonia
Lake Hoskins	1234	1775	0.645	1.79	1.141	0.112
NDDH	961	1438	1.66	2.26	0.008	0.041
Statewide	1209	1604	0.248	2.34	0.069	0.347

Samples Collected

Crown Butte

Outlet- 16

Lake- 42

Inlet- 21

Sweetbriar

outlet- 57

NE- 24

Main- 34

Texas- 4

Lake- 47

NW- 24



mg/L		TDS	Cond	TP	TKN	N+N	Ammoni a	DissP	TSS	TN
Statewide		1209	1604	0.248	2.34	0.069	0.347			
NDDH		961	1438	1.66	2.26	0.008	0.041			
Lake Hoskins		1234	1775	0.645	1.79	1.141	0.112			
Crown Butte	Inlet			0.238	1.78	0.041	0.077	0.17	20.95	1.817
	Lake	1135	1669	0.148	1.898	0.074	0.227	0.01		1.959
	Outlet			0.074	1.313	0.103	0.15	0.039	15.667	0.103
Sweet Briar	northwest			0.339	3.136	0.047	0.04	0.141	44.82	3.176
	southwest			0.116	0.028	0.028	0.102	0.076	12.88	1.246
	northeast			0.039	3.136	0.047	1.479	0.141	44.82	3.176
	texas			0.048	0.999	0.037	0.055	0.017	17.5	0.801
	Lake	1030	1528	0.202	1.135	0.046	0.086	0.171		1.171
	Outlet			0.137	1.059	0.069	0.135	0.111	27.37	1.122

Appendix #7

2006 LIST OF SECTION 303(D) TMDL WATERS FOR THE MISSOURI RIVER BASIN IN MORTON COUNTY

Table II-3. 2006 List of Section 303(d) TMDL Waters for the Missouri River Basin in North Dakota

Assessment Unit ID	AU Description	AU Size	Designated Use	Use Support	Impairment	TMDL Priority
ND-10110203-001-S_00	Little Missouri River from its confluence with Little Beaver Creek downstream to its confluence with Deep Creek	75.79 miles	Recreation	Fully Supporting but Threatened	Total Fecal Coliform	2
ND-10110203-025-S_00	Little Missouri River from its confluence with Deep Creek downstream to its confluence with Andrews Creek	48.25 miles	Recreation	Not Supporting	Total Fecal Coliform	2
ND-10110205-001-S_00	Little Missouri River from its confluence with Beaver Creek downstream to Highway 85	58.94 miles	Recreation	Not Supporting	Total Fecal Coliform	2
ND-10110205-033-S_00	Little Missouri River from Highway 85 downstream to its confluence with Cherry Creek	23.79 miles	Recreation	Fully Supporting but Threatened	Total Fecal Coliform	2
ND-10130101-002-L_00	Brush Lake	200 acres	Fish and Other Aquatic Biota	Fully Supporting but Threatened	Nutrient/Eutrophication	2
			Recreation	Fully Supporting but Threatened	Oxygen, Dissolved Nutrient/Eutrophication	2
ND-10130101-002-S_00	Square Butte Creek from its confluence with Otter Creek downstream to its confluence with the Missouri River	1.79 miles	Fish and Other Aquatic Biota	Fully Supporting but Threatened	Sedimentation/Siltation	2
			Recreation	Not Supporting	Total Fecal Coliform	2

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Table II-3. 2006 List of Section 303(d) TMDL Waters for the Missouri River Basin in North Dakota (cont.)

Assessment Unit ID	AU Description	AU Size	Designated Use	Use Support	Impairment	TMDL Priority
ND-10130201-037-S_00	Coyote Creek from its confluence with Beaver Creek downstream to its confluence with the Knife River	17.24 miles	Recreation	Fully Supporting but Threatened	Total Fecal Coliform	2
ND-10130201-042-S_00	Knife River from its confluence with branch of Knife River downstream to its confluence with Coyote Creek	35.99 miles	Recreation	Fully Supporting but Threatened	Total Fecal Coliform	2
ND-10130202-001-L_00	Lake Tschida	5018 acres	Recreation	Fully Supporting but Threatened	Nutrient/Eutrophication	2
ND-10130202-004-L_00	Dickinson Dike	18.8 acres	Fish and Other Aquatic Biota	Fully Supporting but Threatened	Nutrient/Eutrophication	1A
					Oxygen, Dissolved	1A
					Sedimentation/Siltation	1A
					Nutrient/Eutrophication	1A
ND-10130202-050-S_00	Heart River from Patterson Lake downstream to its confluence with the Green River	24.7 miles	Recreation	Fully Supporting but Threatened		
			Fish and Other Aquatic Biota	Not Supporting	Biological Indicators	2
ND-10130203-002-L_00	Crown Butte Dam	31.2 acres	Fish and Other Aquatic Biota	Fully Supporting but Threatened	Nutrient/Eutrophication	1A
					Oxygen, Dissolved	1A
					Sedimentation/Siltation	1A
					Nutrient/Eutrophication	1A
ND-10130203-005-L_00	Sweetbriar Reservoir	270.6 acres	Recreation	Fully Supporting but Threatened	Nutrient/Eutrophication	1A
ND-10130203-007-L_00	Danzig Dam	147.5 acres	Recreation	Fully Supporting but Threatened	Nutrient/Eutrophication	2
			Fish and Other Aquatic Biota	Fully Supporting but Threatened	Oxygen, Dissolved	2
					Sedimentation/Siltation	2
					Nutrient/Eutrophication	2
ND-10130204-001-L_00	Sheep Creek Dam	84.4 acres	Recreation	Fully Supporting but Threatened	Nutrient/Eutrophication	1A

Appendix #8

ND DEPARTMENT OF HEALTH SURVEY OF MORTON COUNTY AFO'S

ND Department of Health Survey of Morton County AFO's

HUA	WATERSHED	# of H/L's	# of H/M's	# of H/S's	# of M/M's	# of M/S's	TOTAL
10130101- 120, 130	Otter Creek	1	6	2	0	0	9
10130203- 100	Crown Butte	0	9	2	1	1	13
10130203- 110	Sweet Briar	1	19	10	6	4	40
10130203- 100, 120	Heart River Corridor	5	55	40	20	16	136
10130206- 040	Chanta Peta West	0	21	20	11	6	58
10130206- 060	Chanta Peta East	1	13	14	1	5	34
10130206- 020, 050	Cannonball River	0	6	4	2	2	14
10130203- 060, 070	Big Muddy (Danzig Dam)	6	31	36	13	6	92
10130201- 050, 100	Knife River	1	5	3	1	1	11
10130203- 020, 040	Heart Butte	0	10	9	3	0	22
10130203- 080	Beaver Creek	0	10	8	5	2	25
10130102- 010	Little Heart River	4	21	32	14	11	82
10130102- 030	Rice Creek	0	3	6	0	2	11
TOTAL		19	209	186	77	56	547

H/ = high potential to pollute
M/ = medium potential to pollute

/L = >1000 animal units
/M = 300 to 999 animal units
/S = <300 animal units

Appendix #9

BUDGET TABLES

BUDGET TABLE FOR MORTON COUNTY LIVESTOCK MANURE/NUTRIENT MANAGEMENT PROGRAM

Funding Sources:	2007	2008	2009	2010	2011	TOTAL
EPA Section 319 Funds						
1) FY07 Funds (FA)	\$ 162,900	\$ 162,390	\$ 194,040	\$ 200,730	\$ 202,840	\$ 922,900
State/Local Match						
1) Local SCD (TA&FA)	\$ 28,600	\$ 28,260	\$ 29,360	\$ 30,500	\$ 31,907	\$ 148,627
3) Landowners (FA)	\$ 80,000	\$ 80,000	\$ 100,000	\$ 103,320	\$ 103,320	\$ 466,640
Subtotals	\$ 108,600	\$ 108,260	\$ 129,360	\$ 133,820	\$ 135,227	\$ 615,267
TOTAL 319/LOCAL BUDGET	\$ 271,500	\$ 270,650	\$ 323,400	\$ 334,550	\$ 338,067	\$ 1,538,167
Other Federal Funds						
1) NRCS (TA&FA)	\$ 260,000	\$ 260,000	\$ 390,000	\$ 390,000	\$ 390,000	\$ 1,690,000
TOTAL PROJECT BUDGET	\$ 531,500	\$ 530,650	\$ 713,400	\$ 724,550	\$ 728,067	\$ 3,228,167

FA - Financial Assistance

TA - Technical Assistance

NRCS - Natural Resources Conservation Service

SCD - Soil Conservation District

PART 2- Funding Morton County Livestock Manure Management Program

Section 319/Non-federal Budget

	2007	2008	2009	2010	2011	TOTAL COSTS	CASH/INKIND* MATCH	319 FUNDS
PERSONNEL/SUPPORT								
1) Salary/Fringe	\$43,500	\$45,200	\$47,000	\$48,600	\$50,700	\$235,000	\$94,000	\$141,000
2) Travel	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000	\$10,000	\$15,000
3) Equipment/Supplies	\$5,000	\$2,500	\$2,000	\$1,500	\$1,500	\$12,500	\$5,000	\$7,500
4) Training	\$2,500	\$800	\$500	\$300	\$167	\$4,267	\$1,707	\$2,560
5) Telephone/Postage	\$1,000	\$1,200	\$1,400	\$1,600	\$1,800	\$7,000	\$2,800	\$4,200
<i>Subtotals</i>	<i>\$57,000</i>	<i>\$54,700</i>	<i>\$55,900</i>	<i>\$57,000</i>	<i>\$59,167</i>	<i>\$283,767</i>	<i>\$113,507</i>	<i>\$170,260</i>
APPLYING BMP'S								
1) Ag Waste Systems	\$200,000	\$200,000	\$250,000	\$258,300	\$258,300	\$1,166,600	\$466,640	\$699,960
<i>Subtotals</i>	<i>\$200,000</i>	<i>\$200,000</i>	<i>\$250,000</i>	<i>\$258,300</i>	<i>\$258,300</i>	<i>\$1,166,600</i>	<i>\$466,640</i>	<i>\$699,960</i>
INFORMATION/EDUCATION								
1) Newsletter/Radio	\$2,500	\$3,000	\$3,500	\$4,000	\$4,000	\$17,000	\$6,800	\$10,200
2) Tours/Workshops	\$3,000	\$3,200	\$3,500	\$4,000	\$4,600	\$18,300	\$7,320	\$10,980
3) School Programs	\$1,000	\$1,500	\$2,000	\$2,500	\$3,000	\$10,000	\$4,000	\$6,000
<i>Subtotals</i>	<i>\$6,500</i>	<i>\$7,700</i>	<i>\$9,000</i>	<i>\$10,500</i>	<i>\$11,600</i>	<i>\$45,300</i>	<i>\$18,120</i>	<i>\$27,180</i>
ADMINISTRATIVE								
1) Secretary	\$3,000	\$3,250	\$3,500	\$3,750	\$4,000	\$17,500	\$7,000	\$10,500
2) SCD/Coordination Meetings	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000	\$10,000	\$15,000
<i>Subtotals</i>	<i>\$8,000</i>	<i>\$8,250</i>	<i>\$8,500</i>	<i>\$8,750</i>	<i>\$9,000</i>	<i>\$42,500</i>	<i>\$17,000</i>	<i>\$25,500</i>
TOTAL 319/NON-FEDERAL BUDGET	\$271,500	\$270,650	\$323,400	\$334,550	\$338,067	\$1,538,167	\$615,267	\$922,900

* Includes match from both State and local sources